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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,306	06/26/2003	Tza-Jing Gung	006265 P 01 CPI/COPPER	8991

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Applied Materials, Inc.  
Patent / Legal Dept.  
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EXAMINER

VERSTEEG, STEVEN H

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 08/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/608,306

Applicant(s)

GUNG ET AL.

Examiner

Steven H. VerSteeg

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 24-35 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 1-12, 24 and 35 is/are allowed.  
6) ☒ Claim(s) 25-27 and 29-34 is/are rejected.  
7) ☒ Claim(s) 28 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 05 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 25-27, 29, and 31-33 are rejected under 35 U.S.C. 102(e) as being anticipated by  
US 6,579,421 B1 to Fu

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C.

102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

3. For claim 25, Applicant requires a plasma sputter and processing reactor comprising a vacuum chamber arranged about a central axis and configured to be sealed to a sputter target and comprising a surface material to be sputtered; a pedestal when in a processing position for supporting a substrate to be processed in opposition to the target across a processing space extending along the central axis between the target and pedestal; a first electromagnetic coil and a second electromagnetic coil coaxially arranged around the central axis and radially outside of the

Art Unit: 1753

processing space, wherein the second coil is disposed radially outside of the first coil and is at least partially coextensive therewith along the central axis.

4. For claim 29, Applicant requires a processing method comprising exciting a plasma within a reactor to effect processing of the substrate and passing a substantially DC current through an electromagnetic coil of a sufficient level to inhibit diffusion of the plasma to an RF coil. The apparatus comprising a vacuum chamber arranged about a central axis and sealed to a sputter target; a pedestal supporting a substrate to be processed in opposition to the target across a processing space extending along the central axis between the target and pedestal; an RF coil arranged around the central axis; and an electromagnetic coil arranged radially outside the RF coil and at least partially axially co-extensive therewith.

5. Fu discloses a sputter apparatus comprising a vacuum chamber 12; pedestal 14 opposite to the target; RF coil 24; and electromagnetic coils 30-33 arranged coextensive with the RF coil and radially outside the coil (Figures 3 and 4). The method involves exciting a plasma and passing a DC current through the electromagnetic coils (col. 4, l. 66 – col. 5, l. 8; claim 13). It is inherent that plasma is inhibited from diffusion to the RF coil.

6. For claim 26, Applicant requires the coils to be independently powered. For claim 27, Applicant requires a first power supply powering the first coil and a second power supply powering the second coil. Fu discloses separate power supplies (Figures 3 and 4).

7. For claim 31, Applicant requires the exciting step to include applying DC power to the target. For claim 32, Applicant requires applying RF power to the coil. The target is DC powered (col. 3, l. 26-28) and the coil is RF powered (col. 3, l. 54-56).

Art Unit: 1753

8. For claims 33 and 34, Applicant requires the electromagnetic coil to be wrapped around the central axis. As can be seen from Figure 3, the coils 30-33 wrap around the chamber and thus, the central axis. The coils 30-33 can collectively be considered an electromagnetic coil outside the processing space for purposes of claims 33 and 34.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 30 is rejected under 35 U.S.C. 103(a) as being obvious over US 6,579,421 B1 to Fu in view of *Method For Controlling The Crystalline Phase Of Tantalum*, IBM Technical Disclosure Bulletin, Vol. 32, No. 5A pg. 42-43, October 1989 (IBM).

11. The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in

Art Unit: 1753

accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

12. For claim 30, Applicant requires the target to comprise a surface region of tantalum. Fu does not disclose the target material, thus, any suitable sputtering material would be obvious.

13. IBM discloses that tantalum is a known sputtering target material (pg. 42).

14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Fu to utilize tantalum as the sputtering target material because of the desire to utilize a known sputtering target material.

***Response to Amendment***

15. The objection to the drawings presented in the office action mailed March 11, 2005 is withdrawn in light of the amendment.

16. The objection to the specification presented in the office action mailed March 11, 2005 is withdrawn in light of the amendment.

17. The claim objection of claims 3, 4, and 29-32 presented in the office action mailed March 11, 2005 is withdrawn in light of the amendment.

18. The 112-second paragraph rejection of claims 26 and 27 presented in the office action mailed March 11, 2005 is withdrawn in light of the amendment.

19. The 102(e) rejection of claims 25-27, 29, 31, and 32 over Fu presented in the office action mailed March 11, 2005 stands.

Art Unit: 1753

20. The 103(a) rejection of claim 30 over Fu in view of IBM presented in the office action mailed March 11, 2005 stands.

***Allowable Subject Matter***

21. Claims 1-12, 24, and 35 are allowed.

22. Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

23. Applicant's arguments filed July 5, 2005 have been fully considered but they are not persuasive.

24. Applicant has argued that claim 25 has been misinterpreted and that the written description of the specification makes it clear that the coil must be wrapped about the central axis. Claim 25 does not contain any such limitation. Also, it is the claims, not the specification, that provide the patent limitations.

25. Applicant then argues that coils 30-33 of Fu are not disposed around the chamber, but are on different sides and use only a single power supply. I believe that Applicant has misunderstood the rejection. The RF coil 24 is equivalent to the first electromagnetic coil in claim 25. The electromagnetic coils 30-33 are equivalent to the second electromagnetic coil in claim 25 and are radially outside coil 24. The coils 30-33 are around the central axis. Coil 24 and coils 30-33 have separate power supplies.

Art Unit: 1753

26. Please note that in giving claim 25 the broadest reasonable interpretation, my interpretation of claims 25 only requires the second electromagnetic coil to be “outside of said processing space”, not both the first and second coils.

27. Regarding the second electromagnetic coil, there is no limitation that it must be comprised of only a single coil. Thus, the multiple coils 30-33 can collectively comprise the equivalent to the second electromagnetic coil claimed in claim 25.

28. Regarding Applicant’s statement that I have read limitations into the claims not found, I believe the charge is baseless. You have cited no instance where I have read in limitations not found in the claims. You have merely made a generic accusation with no factual support. Please specifically cite such limitations in your next response.

29. Applicant then argues that Fu is silent about inhibiting diffusion. I recognize the argument, but the rejection states that it is inherent, not explicitly stated. Therefore, it is not surprising that Fu does not discuss diffusion.

### ***General Information***

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.



***Conclusion***

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

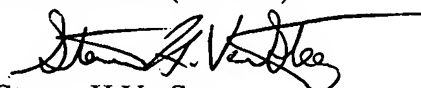
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
July 28, 2005